

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application No. : 10/765,252 Confirmation No. 9565  
Applicant : THOMAS G. RUKAVINA  
Filed : January 27, 2004  
Title : URETHANE POLYOL PRECURSORS  
FOR COATING COMPOSITIONS  
Attorney Docket No. : 1908A1/RC  
Group Art Unit : 1794  
Examiner : Thao T. TRAN  
Customer No. : 24959

**Mail Stop Appeal Brief - Patents**

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal mailed on October 24, 2008 and received by the Patent Office on October 24, 2008. The Notice of Appeal appeals the final rejection of claims 1-9.

The headings used hereinafter and the subject matter set forth under each heading are in accordance with 37 C.F.R. § 41.37.

I

### **REAL PARTY IN INTEREST**

PPG Industries, Inc. is the Assignee of the entire right, title, and interest to the above-identified application and, as such, is the real party in interest in this Appeal.

II

### **RELATED APPEALS AND INTERFERENCES**

There are no appeals or interferences known to the Appellant, the Appellant's legal representative, or the Assignee of the above-identified application which will directly affect or be directly affected by, or have a bearing on the Board's decision in the pending Appeal.

III

### **STATUS OF CLAIMS**

Claims 1-9 are currently pending in this application.

Claims 1-9 stand finally rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1-9 stand finally rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.

Claims 1-6 and 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 3,917,570 to Chang et al. (hereinafter "the Chang patent").

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chang patent in view of United States Patent No. 4,264,752 to Watson (hereinafter "the Watson patent").

All of claims 1-9 are at issue in this Appeal.

IV

### **STATUS OF AMENDMENTS**

No claims were amended after final rejection. A copy of the claims involved in this Appeal in their current form is contained in the Claims Appendix attached hereto.

V

### **SUMMARY OF CLAIMED SUBJECT MATTER**

The invention of independent claim 1 is directed to a trimeric unsymmetrical polyurethane polyol comprising the reaction product of diisocyanate; a linear aliphatic diol having 1-6 carbon atoms; and a linear polymeric diol having at least one oxycarbonyl linkage and having from 5-20 carbon atoms. [Specification, page 3, lines 8-13]. The trimeric polyurethane polyol is represented by the formula: x moles aliphatic diol: 1 mole

diisocyanate: y moles polymeric diol, where  $x + y = 2$ . Additionally, the polyurethane polyol has hydroxyl termination. [Specification, page 7, lines 2-6].

## **VI**

### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 1-9 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.
2. Claims 1-9 stand finally rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.
3. Claims 1-6 and 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chang patent.
4. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chang patent in view of the Watson patent.

## **VII**

### **ARGUMENT**

Each issue presented for review is addressed hereinafter under the appropriate heading:

#### **1. CLAIMS 1-9 STAND REJECTED UNDER 35 U.S.C. § 112, FIRST PARAGRAPH**

Claims 1-9 stand rejected under 35 U.S.C. § 112, first paragraph, because the Examiner states that the phrase "average molecular distribution of three monomeric units" was not described in the specification as originally filed.

While Appellant disagrees that this language is not supported in the original specification, claim 1 was amended to remove the phrase "has an average molar distribution of three monomeric units" in the Amendment dated March 19, 2008. Claim 1 was amended to recite that "the trimeric polyurethane polyol is represented by the formula: x moles aliphatic diol: 1 mole diisocyanate: y moles polymeric diol, where  $x + y = 2$ ." Support for this language is found in paragraph [0018] of the original specification. This language conveys to those skilled in the art that applicant invented the subject matter claimed.

Therefore, reconsideration and removal of the rejection of claims 1-9 under 35 U.S.C. § 112, first paragraph, is respectfully requested.

#### **2. CLAIMS 1-9 STAND REJECTED UNDER 35 U.S.C. § 112, second paragraph**

Claims 1-9 also stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. However, as discussed above, claim 1 was amended to remove the phrase "has an average molar distribution of three monomeric units" in the Amendment dated March

19, 2008. Therefore, the rejection under 35 U.S.C. § 112, second paragraph, should be removed.

Additionally, Appellant asserts that the claims in their current form comply with 35 U.S.C. § 112, second paragraph. As previously indicated, claim 1 now recites that "the trimeric polyurethane polyol is represented by the formula: x moles aliphatic diol: 1 mole diisocyanate: y moles polymeric diol, where  $x + y = 2$ " as supported in paragraph [0018] of the original specification.

Therefore, reconsideration and removal of the rejection of claims 1-9 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

**3. CLAIMS 1-6 AND 8-9 STAND REJECTED UNDER 35 U.S.C. § 103(a) AS BEING OBVIOUS IN VIEW OF THE CHANG PATENT**

Claims 1-6 and 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chang patent.

The Chang patent teaches a composition formed by the reaction product of a polyurethane polyol, which must contain at least 0.075 percent by weight acidic carboxyl groups and an alkylenimine. [The Chang patent, column 2, lines 10-15]. The polyurethane polyol of the Chang patent is produced by reacting a polyhydric material with a functionality of 3 or more with an organic polyisocyanate. [The Chang patent, column 2, lines 19-23]. [Rukavina Declaration, paragraph 6]. The Chang patent states that the "overall functionality per unit weight of polyhydric material used to produce the polyurethane polyol is important" and that "The polyhydric material preferably should contain (or be formed from) at least about 0.01 gram-mole, and most preferably at least about 0.05 gram-mole...of compounds having a functionality of 3 or more...." [The Chang patent column 5, lines 4-14]. Further, Chang specifies "when the polyhydric material contains no compounds having a functionality of 3 or more, a terminating agent having a functionality of at least 2 should be used to insure that a hydroxyl containing product is formed." [The Chang patent, column 6, lines 34-39].

***a. The claimed invention is not obvious in view of the Chang patent because the Chang patent requires a polyhdric material with a functionality of 3 or more.***

A *prima facie* case of obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. MPEP §2144.05. One example is *Cf. Crown Operations International, Ltd. v. Solutia*, 289 F.3d 1367, 1372 where the Federal Circuit found that the prior art taught away from the claimed invention. The claimed invention was directed towards a safety and solar control glass assembly in which a multi-layered film between glass layers included a metal-coated solar control film, the claims

required, *inter alia*, that the solar control film contribute visible light reflection that is two percent (2%) or less of the reflection of the assembly: this solved a "wrinkle" problem. The prior art was directed towards a solar film required to contribute visible light reflection that is three percent (3%). Additionally, the prior art generally sought to reduce visible light reflectivity, and described the disadvantages of a very thin metal coating on the substrate, including sacrificing infrared reflectivity. Therefore, the Federal Circuit concluded that prior art that taught a visible light reflection of 3% taught away from a claimed light reflection of 2% or less.

The *Cf. Crown Operations International, Ltd. v. Solutia* case is similar to the present application. Particularly, the teaching of the Chang patent, which requires a polyhydric material having a functionality of 3 or more, teaches against the trimeric unsymmetrical polyurethane polyol of the claimed invention utilizing linear polymers with a functionality of 2. The claimed trimeric unsymmetrical polyurethane polyol is the reaction product of diisocyanate; a linear aliphatic diol having 1-6 carbon atoms; and a linear polymeric diol having at least one oxycarbonyl linkage and having from 5-20 carbon atoms. The linear aliphatic diol and the linear polymeric diol of the claimed invention have a functionality of 2. [Rukavina Declaration, paragraph 6]

In contrast to the claimed invention, the Chang patent teaches that the polyhydric material should contain (or be formed from) compounds having a functionality of 3 or more and indicates that if a polyhydric material with a functionality of less than 3 is utilized, a termination agent is necessary for the formation of the polyurethane polyol. Therefore, the teachings of the Chang patent (*i.e.*, requiring a termination agent to form a polyurethane polyol when a polyhydric material with a functionality of less than 3 is used), teaches away from the claimed polyurethane polyol formed by the linear aliphatic diol and the linear polymeric diol having a functionality of 2. Since the Chang patent requires a polyhydric material with a functionality of 3 or more without the need for a termination agent, and the claimed invention utilizes the linear aliphatic diol and the linear polymeric diol having a functionality of 2 to form a polyurethane polyol, the Chang patent teaches away from the claimed invention.

***b. The claimed invention is not obvious in view of the Chang patent because the Chang patent does not teach or suggest the claimed formula and ratios that represent the claimed unsymmetrical trimeric prepolymer polyol***

It is also noted that the Chang patent does not teach or suggest the claimed formula and ratios that represent the claimed unsymmetrical trimeric prepolymer polyol. [Rukavina Declaration, paragraph 6] Specifically, the claimed invention is directed to a trimeric polyurethane prepolymer represented by the formula: x moles aliphatic diol: 1 mole

diisocyanate: y moles polymeric diol where  $x + y = 2$ . The Chang patent indicates that "the ratios of the components of the polyhydric material, the polyisocyanate, and any terminating agent may be varied..." [the Chang patent, column 6, lines 51-53] However, even if the Examiner is correct in his statement that the Chang patent discloses the claimed ratio and formula by stating that the ratios of the components "may be varied", it is understood that a *prima facie* case of obviousness based on overlapping ranges may be rebutted by showing the criticality of the claimed range. MPEP 2144.05 III. As indicated in the specification of Appellant's application, "providing a trimeric polyurethane prepolymer with specific ratios of the short chain diol and the polyol with respect to the diisocyanate produces an effective prepolymer composition particularly useful for polyurethane coating compositions." [Specification, paragraph 20] Namely, "the prepolymers prepared in accordance with the present invention within the content ratios set forth herein can achieve an effective tradeoff between performance and viscosity." Simply teaching "varying" the ratios, as is disclosed by the Chang patent, does not teach or suggest the claimed formulas and ratios of the claimed polyurethane polyols which keep the viscosity low for high solids coatings with good mechanical properties. [Rukavina Declaration, paragraph 6] Therefore, because the Chang patent does not teach or suggest the claimed formula and ratio that represent the claimed unsymmetrical trimeric prepolymer polyol, the claimed invention is not obvious in view of the Chang patent.

***c. The claimed invention is not obvious in view of the Chang patent because the Chang patent does not teach the claimed unsymmetrical trimeric prepolymer polyol***

Additionally, the claimed invention is not obvious in view of the Chang patent because the Chang patent does not teach or suggest the claimed unsymmetrical trimeric prepolymer polyol. Specifically, symmetrical polymers typically have higher viscosity. [Specification, paragraph 20] Thus, the more asymmetry that is designed into the prepolymer, the lower will be the viscosity. [Specification, paragraph 20] The Chang patent did not intend or appreciate reacting unsymmetrical polyols with diisocyanates for low viscosity and high solids. [Rukavina Declaration, paragraph 6] A unique characteristic of the claimed polyurethane polyols is their asymmetry, which prevents crystallization and promotes high viscosity. [Rukavina Declaration, paragraph 6] Chang does not specify the unsymmetric trimeric oligomers that are necessary in the claimed invention to keep the viscosity low for high solids coatings with good mechanical properties. [Rukavina Declaration, paragraph 6] Because the Chang patent does not teach or suggest the specific claimed unsymmetrical trimeric prepolymer polyol, reconsideration of the rejection of claim 1 is respectfully requested.

**d. The claimed invention is not obvious in view of the Chang patent because the Chang patent does not teach or suggest the claimed trimeric polyol having linear polyol functionality**

Also, the claimed trimeric polyol having linear polyol functionality is not taught or suggested by the Chang patent. [Rukavina Declaration, paragraph 6] Specifically, the polyurethane polyols of the Chang patent "contain at least 0.075, and preferably at least 0.10 percent by weight of acidic carboxyl groups..." [The Chang patent, column 6, lines 65-67; column 2, lines 10-15] Because a polyol having a branched structure of an acidic carboxyl group would not teach or suggest the claimed trimeric polyol having linear polyol functionality, the claimed invention is not obvious in view of the Chang patent.

**e. The claimed invention is not obvious in view of the Chang patent because the Chang patent does not teach or suggest the claimed linear polymeric diol having an oxycarbonyl linkage**

Finally, the claimed polyol formed from a linear aliphatic diol and a linear polymeric diol having an oxycarbonyl linkage is not taught or suggested by the Chang patent. On page 3 of the Office Action, the Examiner states that the Chang patent discloses a polyurethane polyol produced by reacting a polyhydric material with an organic polyisocyanate and equates the polyhydric material of the Chang patent with the claimed linear aliphatic diol and the linear polymeric diol having an oxycarbonyl linkage. Appellant argues that the polyhydric material described by the Chang patent does not teach or suggest the linear polymeric diol having the oxycarbonyl linkage of the claimed invention. First the Examiner indicates that the caprolactone diol discussed in the Chang patent teaches the linear polymeric diol having an oxycarbonyl linkage. Appellant traverses this statement because caprolactone diol has a ring structure and, therefore, cannot be linear. [Office Action, page 3] [The Chang patent, see column 4, lines 5-9] The disclosure of caprolactone diol teaches against the linear polymeric diol having an oxycarbonyl linkage. Additionally, the Examiner states that butanediol and trimethylolpropane would teach or suggest the linear polymeric diol having an oxycarbonyl linkage. [Office Action, page 4] [The Chang patent, see column 5, lines 19-30] Appellant argues that neither butanediol nor trimethylolpropane have an oxycarbonyl linkage, and, therefore, would not teach or suggest the claimed linear polymeric diol having an oxycarbonyl linkage. Since the teachings of Chang do not teach or suggest the claimed linear polymeric diol having an oxycarbonyl linkage, the claimed invention is not obvious in view of the Chang patent.

**f. Dependent claims 2-6 and 8-9 are not taught or suggested by the Chang patent**

Claims 2-9 depend from claim 1 and are believed to be allowable for the same reasons as claim 1.

**4. CLAIM 7 STANDS REJECTED UNDER 35 U.S.C. § 103(a) AS BEING OBVIOUS OVER THE CHANG PATENT AND FURTHER IN VIEW OF THE WATSON PATENT**

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang as applied to claim 1 further in view of the Watson patent. As discussed above, Chang does not teach or suggest the limitations of claim 1. The Watson patent does not overcome this deficiency. Watson merely shows a polyurethane prepared from an alkylene glycol carbonate or a polyoxyalkylene glycol carbonate formed from hexylene glycol or propylene glycol. Accordingly, claim 7 is believed patentable over Chang and Watson. Reconsideration of the rejection of claim 7 is respectfully requested.


**CONCLUSION**

For the reasons set forth above, Appellant believes claims 1-9 are patentable over the cited art and are in condition for allowance. Reversal of all of the Examiner's rejections and allowance of these claims are respectfully requested.

The Commissioner of Patents and Trademarks is hereby authorized to charge the fee of \$40.00 by credit card, which information accompanies this Appeal Brief. Appellant previously submitted an Appeal Brief and \$500.00 fee on February 2, 2006. Appellant submits herewith a fee of \$40.00 for the difference between the current fee (\$540.00) and the amount previously paid (\$500.00). The Commissioner of Patents and Trademarks is hereby authorized to charge any additional fees which may be required to Deposit Account Number 16-2025. Please refund any overpayments to Deposit Account Number 16-2025.

Respectfully submitted,

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### Claim Appendix

1. (Previously Presented) A trimeric unsymmetrical polyurethane polyol comprising the reaction product of:

- a) a diisocyanate;
- b) a linear aliphatic diol having 1-6 carbon atoms; and
- c) a linear polymeric diol having at least one oxycarbonyl linkage and

having from 5-20 carbon atoms,

wherein the trimeric polyurethane polyol is represented by the formula:

x moles aliphatic diol: 1 mole diisocyanate: y moles polymeric diol, where

$x+y=2$ , and

wherein the polyurethane polyol has hydroxyl termination.

2. (Previously Presented) A polyurethane polyol as in claim 1, wherein the diisocyanate is selected from the group consisting of 2,2,4-trimethylhexamethylene diisocyanate, 1,6-hexamethylene diisocyanate, 1,1'-methylene-bis-(4-isocyanatocyclohexane), 4,4'-methylene-bis-(cyclohexyl diisocyanate), hydrogenated toluene diisocyanate, 4,4'-isopropylidene-bis-(cyclohexyl isocyanate), 1,4-cyclohexyl diisocyanate, 4,4'-dicyclohexyldiisocyanate, and 3-isocyanato methyl-3,5,5-trimethylcyclohexyl diisocyanate, and mixtures and combinations thereof.

3. (Previously Presented) A polyurethane polyol as in claim 1, wherein the diisocyanate is aliphatic.

4. (Previously Presented) A polyurethane polyol as in claim 1, wherein the aliphatic diol is selected from the group consisting of 1,2-propanediol, ethyl-1,3-hexanediol, 1,6-hexanediol, 2-methyl propanediol, and 1,5-pentanediol, and mixtures and combinations thereof.

5. (Previously Presented) A polyurethane polyol as in claim 1, wherein the aliphatic diol includes an odd number of carbon atoms.

6. (Previously Presented) A polyurethane polyol as in claim 1, wherein the polymeric diol is selected from the group consisting of polycarbonate diols and polycaprolactone diols, and mixtures thereof.

7. (Previously Presented) A polyurethane polyol as in claim 1, wherein the diisocyanate is 2,2,4-trimethylhexamethylene diisocyanate, wherein the aliphatic diol is 1,5-pentanediol, and wherein the polymeric diol is polyoxohexylene carbonate diol.

8. (Previously Presented) A polyurethane polyol as in claim 1, wherein the ratio of the diisocyanate:aliphatic diol:polymeric diol is from about 1: 1.9:0.1 to about 1:1.1:0.9

9. (Previously Presented) A polyurethane polyol as in claim 1, wherein the reaction product comprises a low viscosity, non-crystalline substantially 100 percent solids material.

10-23. (Cancelled)

### **Evidence Appendix**

Rukavina Declaration	Entered on July 10, 2007 with the Response to the Office Action dated June 19, 2007
United States Patent No. 3,917,570 to Chang	Cited in Office Actions dated March 7, 2007; September 20, 2007; July 24, 2008
United States Patent No. 4,264,752 to Watson	Cited in Office Actions dated August 10, 2006; September 20, 2007; July 24, 2008

### **Related Proceedings Index**

There are no related proceedings.